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ABSTRACT

The minimum legal drinking age in Illinois was returned to 21 effective January 1, 1980. To examine the effect of this change on accident involvement by young drivers, data from the last 3 years of the lowered drinking age (1977-1979) were compared to the first 3 years of the restored drinking age (1980-1982). Data were obtained from the Illinois Accident Record System and the Fatal Accident Reporting System (FARS). The analysis of involvement rates in fatal accidents showed a statisically significant reduction from the before period (1977-1979) to the after period (1980-1982) for drivers of age 20 and under (21.7 percent). At the same time the analysis showed that drivers aged 21 and older had a reduction of 13.9 percent in their involvement rates. Thus, while drivers of all ages showed reductions in the rates of fatal accident involvement, the drivers influenced by the changed law experienced 1.5 times the reduction of their elder counterparts. The reduction from the before period to the after period, using the three factor surrogate (3FS) fatal accident involvement for drivers 20 and younger, showed they experienced a 12.0 percent reduction, while drivers 21 and older showed a 2.0 percent reduction in 3FS involvement rates. Essentially the same differentials were observed for the two age groups in all remaining accidents other than fatal accidents. Thus, the principal conclusion is that raising the legal minimum drinking age positively affected the drinking and driving behavior of drivers age 20 and under. (JAC)

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Illinois Department of Transportation
Division of Traffic Safety

INFLUENCE OF RAISING THE LEGAL MINIMUM DRINKING AGE IN ILLINOIS

Department of Transportation
Division of Traffic Safety

Questions concerning this paper may be addressed directly to the authors.

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INFLUENCE OF RAISING THE LEGAL MINIMUM DRINKING AGE IN ILLINOIS

EXECUTIVE SUMMARY

Effective January 1, 1980, the legal minimum drinking age for beer and wine was raised from 19 to 21. The legal age for distilled spirits remained at 21. These legal ages had prevailed from October 1973 through December of 1979. Prior to October of 1973 and similar to the provisions of the recent law, the legal drinking age in Illinois was 21 for all alcoholic beverages.

In 1977, the Division of Traffic Safety conducted a study researching the effects on traffic safety of the lowering of the legal minimum drinking age. At that time it was established that the lowered drinking age had contributed to an increase in fatalities resulting from accidents involving young drivers. Thus, an increase in the legal drinking age and the concomitant uniformity of the drinking age established throughout the state should reduce the probability of accident involvement by young drivers. This study confirms that.

Utilizing data from both the state's accident record file and the Fatal Accident Reporting System (FARS), it is possible to conclude that while several factors may have influenced the downward trend in accidents, the raised drinking age has contributed to the decline in the accident involvement of drivers 20 and younger. Approximately 55 deaths and 2,750 non-fatal accidents have been prevented in the three-year period since the raised drinking age became effective. This has resulted in a total dollar cost avoidance of approximately 16.7 million dollars.

The analysis of involvement rates in fatal accidents showed a statistically significant reduction from the before period (1977-1979) to the after period (1980-1982) for drivers of age 20 and under (21.7%). At the same time the analysis showed that drivers aged 21 and older had a reduction of 13.9 percent in their involvement rates. Thus, while all ages of drivers showed reductions in the rates of fatal accident involvement, the drivers influenced by the law change experienced 1.5 times the reduction of their elder counterparts. Even more telling was the significant reduction from the before period to the after period using the three factor surrogate (3FS) fatal accident involvement for drivers 20 and younger. They experienced a 12.0 percent reduction while drivers 21 and older showed a 2.0 percent reduction in 3FS involvement rates. Essentially, the same differentials were observed for the two age groups in all remaining accidents other than fatal accidents. Thus, the principal conclusion is that the raising of the legal minimum drinking age positively affected the drinking and driving behavior of drivers age 20 and under.

BACKGROUND

Effective January 1, 1980, the present Illinois drinking age law was the result of legislation introduced during the Spring 1979 session of the Illinois General Assembly. The law returned the minimum legal drinking age to 21 and required all local governmental units to be governed by the 1980 state law, thus preventing home rule units from establishing their own drinking ages.

Before October 1973, when the legal minimum age for the purchase and consumption of beer and wine was lowered to age 19, Illinois' law required

purchasers of all other alcoholic beverages to be 21 or older. The 1980 law merely returned the state's drinking age to its previous legal minimum.

The 1980 law also re-established conformity of Illinois' drinking age with the legal minimum of three neighboring states: Indiana, Kentucky, and Missouri, each having a drinking age of 21. Since March 1972, the age in Wisconsin has been 18 for all alcoholic beverages. Beginning in July 1972, Iowa's drinking age law changed several times. Effective July 1, 1978, the age changed from 18 to 19. The law, however, included a "grandfather" clause for the period of July 1, 1978 to July 1, 1979. It permitted 18 year-olds, born before July 1, 1960, to drink any alcoholic beverage and allowed beer only for those born on that date or later.

The disparity in drinking ages among the six states probably encourages drivers aged 20 and under to cross state boundaries to obtain drinks legal in one state but not in another. Although the 1980 law did not eliminate this tendency, it did eliminate the enticement for younger drivers from Indiana, Kentucky, and Missouri to travel into Illinois. At the same time, however, it may have increased the tendency for the 19 and 20 year-olds to drive from Illinois to Iowa or Wisconsin to legally drink.

In addition to bringing Illinois' drinking age into conformity with that of Indiana, Kentucky, and Missouri, the 1980 law also brought age uniformity within Illinois.

During the period of the lowered drinking age, home rule laws made it possible for young Illinois drivers to go from areas of beer and wine only

to areas of beer, wine, and distilled liquor. Although some home rule units supported the state's drinking ages or passed ordinances with higher minimum ages (for example, age 21 for all alcoholic beverages), some municipalities had lower minimum drinking ages. The age in Galesburg and DeKalb, for example, was 19 for all alcoholic beverages; in Urbana, the age for beer and wine was 18.

Finally, the 1980 law established drinking age uniformity by abolishing the "split" drinking age, which had been age 19 for beer and wine and age 21 for distilled liquor.

METHOD OF ANALYSIS AND FINDINGS

To determine what influence the raised drinking age has had on accident experience, the Division of Traffic Safety compared data for the last three years of the lowered drinking age (1977-1979) with data for the first three years of the restored drinking age (1980-1982). The data were obtained from two sources. One source was Illinois' accident record system, which contains statistics on all motor vehicle accidents occurring within the state. The other source was the Fatal Accident Reporting System (FARS). Fatal accident data from the FARS are more complete; they supply information for analysis both at the state and national levels. The FARS is a federally-sponsored program with all states participating in it.

FARS DATA ANALYSIS

I. DRIVER INVOLVEMENT: BEFORE VS. AFTER

If the change in Illinois' drinking age did influence the drinking and driving behavior of drivers under the age of 21, statistical testing of Illinois' data should show a significant difference before and after in the ages of drivers involved in Illinois' fatal accidents (see Table I at the end of this section). Results of the chi-square test at the 99.9% level of confidence confirm this hypothesis. (The ages tested were (a) 18 and younger, 19 and 20, 21 and older; (b) 20 and younger, 21 and older.)

Analysis of the involvement rates shows that the percentage decreases are significant for drivers of each age group indicated: 18 and younger, 19 and 20, 20 and younger, and also 21 and older (Z-test, 99.9% level of confidence).

Although the results of the chi-square test seem to indicate that the raised drinking age influenced fatal accident involvement with respect to driver age, results of the Z-test show that the fatal accident involvement rates decreased significantly for drivers of all ages. However, because the involvement rate for drivers aged 20 and younger dropped more than 1-1/2 times that for drivers 21 and older, it is possible to surmise that the raised drinking age was a major factor.

II. 3FS DRIVER INVOLVEMENT: BEFORE VS. AFTER

In lieu of using Blood Alcohol Concentration (BAC) data to identify alcohol-related fatal accidents, the Three-Factor Surrogate (3FS) Measure was used to estimate fatal accidents involving alcohol-impaired drivers. Accidents meeting the 3FS criteria are single-vehicle accidents involving a male driver and occurring between 9:00 p.m. and 6:00 a.m. Drivers involved in 3FS accidents generally represent drivers impaired by alcohol.

The discussion here is limited to drivers involved in Illinois' 3FS fatal accidents. All data are summarized in Table 2.

Statistical testing of these data indicates a significant difference between before and after in the involvement of drivers aged 20 and younger and those 21 and older in Illinois' 3FS fatal accidents (chi-square test, 95% level of confidence).

In addition, the percentage changes in involvement rates are significant for drivers aged 18 and younger and for those aged 20 and younger. The 11.7 and 12.0 percent decreases are approximately six times the 2.0 percent decline for drivers aged 21 and older. Furthermore, the 2.0 percent decline in involvement rates for drivers 21 and older was not significant (Z-test, 95% or greater level of confidence).

The results of these tests indicate that the change in Illinois' drinking age law was a principal factor influencing the decline in 3FS (hence, alcohol-related) fatal accidents involving drivers under the age of 21.

TABLE 1
DRIVER INVOLVEMENT IN ILLINOIS' FATAL ACCIDENTS
1977-1979 VS. 1980-1982

Age of Driver	# DRIVERS INVOLVED			INVOLVEMENT RATES[1]		
	Before	After	% Change[3]	Before	After	% Change[3]
18 & Younger	973	705	-27.5	0.759	0.592	-22.0
19 & 20	856	628	-26.6	0.758	0.595	-21.5
20 & Younger	1,829	1,333	-27.1	0.759	0.594	-21.7
21 & Older	6,376	5,638	-11.6	0.352	0.303	-13.9
All Ages[2]	8,238	7,064	-14.3	0.401	0.339	-15.5

1 Number of drivers involved in fatal accidents per 1,000 licensed drivers.
2 Includes drivers with age unknown.
3 Percentage change in data for 1980-1982 compared to 1977-1979.

TABLE 2
DRIVER INVOLVEMENT IN ILLINOIS' 3FS FATAL ACCIDENTS
1977-1979 VS. 1980-1982

Age of Driver	# DRIVERS INVOLVED			INVOLVEMENT RATES[1]		
	Before	After	% Change[3]	Before	After	% Change[3]
18 & Younger	197	162	-17.8	0.154	0.136	-11.7
19 & 20	205	168	-18.0	0.182	0.159	-12.6
20 & Younger	402	330	-17.9	0.167	0.147	-12.0
21 & Older	932	922	- 1.1	0.051	0.050	- 2.0
All Ages[2]	1,341	1,266	- 5.6	0.065	0.061	- 6.2

1 Number of drivers involved in 3FS fatal accidents per 1,000 licensed drivers.
2 Includes drivers with age unknown.
3 Percentage change in data for 1980-1982 compared to 1977-1979.

STATE ACCIDENT DATA ANALYSIS

I. ACCIDENTS AND FATALITIES: BEFORE VS. AFTER

If the raised drinking age had an effect on Illinois' accident experience, the accident involvement of drivers aged 19 and 20 and possibly those aged 18 and younger should decrease with the change in law. Conversely, any change in the involvement of drivers aged 21 and older should be negligible.

Table 3 (at the end of this section) summarizes the number of accidents involving drivers aged 18 and younger, 19 and 20, and 21 and older for the years of interest. (If an accident involved several drivers, it was counted as one accident for each distinct age category of the drivers involved. For example, if an accident involved four drivers: ages 18, 19, 21 and 34, the accident was counted once for drivers aged 18 and younger, once for drivers aged 19 and 20, and once for drivers aged 21 and older.)

As shown in Table 3, accidents involving drivers aged 18 and younger and accidents involving drivers aged 19 and 20 declined by 33.7% and 33.6% respectively. The reduction in accidents involving drivers aged 21 and older was 24.1%. Although the downward trends seem to be substantial for all ages, the decrease in accidents involving drivers below the age of 21 is considerably larger than the decrease for the older drivers.

Table 4 compares the number of fatalities which resulted from accidents involving drivers of certain ages. The method used to tabulate fatalities in Table 4 is similar to that used for the data in Table 3.

Although these data were not tested for statistical significance, it appears that the reductions would be significant for all age groups. It is important to note that the number of fatalities resulting from accidents involving drivers aged 18 and younger and those aged 19 and 20 declined more than twice that for drivers aged 21 and older.

II. 3FS ACCIDENTS AND FATALITIES: BEFORE VS. AFTER

As with fatal accidents, the Three-Factor Surrogate (3FS) Measure was used to estimate all accidents involving alcohol-impaired drivers.

Numerical comparisons of 3FS accidents for drivers aged 18 and younger, 19 and 20, 20 and younger, and 21 and older are summarized in Table 5.

If the change in Illinois' drinking age affected the drinking and driving behavior of drivers aged 20 and younger, statistical testing of these data should show a significant difference before and after in the ages of drivers involved in Illinois' 3FS accidents. Results of the chi-square test at the 99.9% level of confidence confirm this hypothesis. (The ages tested were (a) 18 and younger, 19 and 20, 21 and older; (b) 20 and younger, 21 and older.)

Results of the Z-test show that the 3FS accident involvement rates (Table 6) decreased significantly for all ages (99.5% or greater level of confidence). The rates for drivers aged 18 and younger, 19 and 20, and 20 and younger, dropped approximately two to three times that for drivers 21 and older.

Furthermore, comparisons of the data in Table 7 indicate that the number of fatalities which resulted from 3FS accidents involving a driver aged 20 and younger decreased by 18.9% -- compared to a negligible percentage change in fatalities resulting from accidents involving a driver aged 21 and older.

TABLE 3
NUMBER OF ILLINOIS ACCIDENTS INVOLVING DRIVERS OF SPECIFIED AGE
1977-1979 vs. 1980-1982

Age of Driver	Before	After	% Change[1]
18 & Younger	249,633	165,507	-33.7
19 & 20	177,731	117,971	-33.6
21 & Older	1,007,858	764,569	-24.1

1 Percentage change in number of accidents for 1980-1982 compared to 1977-1979.

TABLE 4
NUMBER OF FATALITIES WHICH RESULTED FROM ILLINOIS ACCIDENTS
INVOLVING DRIVERS OF SPECIFIED AGE
1977-1979 vs. 1980-1982

Age of Driver	Before	After	% Change[1]
18 & Younger	1,130	820	-27.4
19 & 20	1,015	714	-29.7
21 & Older	5,244	4,606	-12.2

1 Percentage change in number of fatalities for 1980-1982 compared to 1977-1979.

TABLE 5
NUMBER OF ILLINOIS 3FS ACCIDENTS INVOLVING DRIVERS OF SPECIFIED AGE
1977-1979 vs. 1980-1982

Age of Driver	Before	After	% Change[2]
18 & Younger	18,343	15,023	-18.1
19 & 20	15,013	11,604	-22.7
20 & Younger	33,356	26,627	-20.2
21 & Older	59,908	57,379	-4.2
All Ages[1]	95,804	86,095	-10.1

[1] Includes drivers with age unknown.
[2] Percentage change in number of 3FS accidents for 1980-1982 compared to 1977-1979.

TABLE 6
INVOLVEMENT RATES OF DRIVERS IN ILLINOIS 3FS ACCIDENTS[1]
1977-1979 vs. 1980-1982

Age of Driver	Before	After	% Change[3]
18 & Younger	14.3	12.6	-11.9
19 & 20	13.3	11.0	-17.3
20 & Younger	13.8	11.9	-13.8
21 & Older	3.3	3.1	-6.1
All Ages[2]	4.7	4.1	-12.8

[1] Number of drivers involved in 3FS accidents per 1,000 licensed drivers. (The number of drivers in 3FS accidents is equal to the number of 3FS accidents.)
[2] Includes drivers with age unknown.
[3] Percentage change in rates for 1980-1982 compared to 1977-1979.

TABLE 7
NUMBER OF FATALITIES WHICH RESULTED FROM ILLINOIS 3FS ACCIDENTS
INVOLVING DRIVERS OF SPECIFIED AGE
1977-1979 vs. 1980-1982

Age of Driver	Before	After	% Change[2]
18 & Younger	203	178	-12.3
19 & 20	232	175	-24.6
20 & Younger	435	353	-18.9
21 & Older	959	958	-0.1
All Ages[1]	1,416	1,336	-5.6

[1] Includes drivers with age unknown.
[2] Percentage change in number of fatalities for 1980-1982 compared to 1977-1979.

ACCIDENT AND COST SAVINGS

Each traffic accident, fatality, and injury imposes costs. The National Safety Council each year estimates the average total financial loss associated with traffic deaths, non-fatal injuries, and accidents involving property damage only. In 1981 these costs were:

Fatality - $190,000 per occurrence
Personal Injury - $7,200 per occurrence
Property Damage - $1,020 per accident.

More generally, the National Safety Council each year estimates the total cost of all accidents nationwide. In the 1982 edition of Accident Facts, the Council reported a total of 18 million accidents which cost approximately $40.6 billion for the year 1981. This comes to approximately $2,255 per accident.

If the drinking age had not been raised, it is likely that the involvement rate for drivers aged 19 and 20 have followed the same trend as that for drivers 21 and older. Therefore, any major difference between the two trends would be attributed to the raised drinking age.

To analyze the cost savings associated with the raised drinking age, only 3FS (alcohol-related) accidents and fatalities were used. Drivers aged 21 and older were involved in 59,908 3FS accidents in the three-year period before the law change and 57,379 3FS accidents in the three-year period after the law change (a drop of 4.2 percent). Drivers affected by the law change (19 and 20 year-olds) were involved in 15,013 3FS accidents before and 11,604 3FS accidents after, for a decline of 22.7 percent. If the law had not been changed, the decreasing involvement of the 19 and 20 year-old drivers would have been similar to that of their older counterparts, thus

decreasing only 4.2 percent instead of 22.7 percent. This would represent a change of only 631 3FS accidents. Drivers aged 19 and 20 would be expected to have been involved in 14,382 3FS accidents (15,013 - 631). The difference then between the expected number (14,382) and the actual number (11,604), or approximately 2,800, represents the total number of 3FS accidents prevented by the change in the law over the three-year period (1980-1982).

Using the same procedure for the involvement of 19 and 20 year-olds in 3FS fatal accidents it is estimated that approximately 55 lives were saved in the three-year period following the law change. In the before period, drivers 21 and older were involved in 3FS fatal accidents that resulted in 959 deaths. In the after period, they were involved in 3FS fatal accidents that resulted in 958 deaths. This is a change of only one-tenth of one percent. For the same two periods, 19 and 20 year-old drivers were involved in 3FS fatal accidents which resulted in 232 deaths before and 175 deaths after (a decline of 24.6 percent). Had deaths resulting from 3FS accidents involving 19 and 20 year-old drivers followed the same trend as those resulting from accidents involving drivers 21 and older, 231 deaths would have been expected. The difference between these expected 231 fatalities and the actual 175, or approximately 55, represents the number of lives saved in 3FS fatal accidents over the three-year period. Using the 1977-1982 average ratio of 1.1 deaths per fatal accident, these 55 deaths would have resulted from 50 fatal accidents.

The cost savings brought about by the revised drinking age law are those associated with the 55 lives saved and the 2,750 non-fatal (2,800 - 50 fatal accidents) 3FS accidents reduced. These cost savings (using NSC cost figures) are:

55 lives saved X $190,000/death = $10,450,000
2,750 non-fatal accidents reduced X $2,250/accident = $ 6,200,000

Total Cost Savings = $16,650,000

Consequently, the raising of the drinking age had a direct benefit of approximately $5.6 million per year in economic costs of 3FS accidents involving 19 and 20 year-old drivers.

CONCLUSIONS

Statistical tests show that reductions in the involvement rates of drivers in Illinois' fatal accidents are significant for the following:

- Drivers aged 18 and younger (-22.0%);
- Drivers aged 19 and 20 (-21.5%);
- Drivers aged 20 and younger (-21.7%);
- Drivers aged 21 and older (-13.9%).

Tests also show that the involvement rates of drivers in 3FS (alcohol-related) fatal accidents decreased significantly for:

- Drivers aged 18 and younger (-16.3%);
- Drivers aged 20 and younger (-15.8%).

While the involvement rate decreased significantly for drivers aged 21 and older in fatal accidents, as well as for drivers aged 20 and younger, they did not decline as sharply. Overall, accidents involving drivers aged 19 and 20 declined by 33.5 percent, while the reduction in accidents involving drivers 21 and older was 24.2 percent.

In 3FS accidents (alcohol-related) the involvement rate for drivers 18 and younger, 19 and 20, and 20 and younger dropped approximately two to three times that of drivers 21 and older. On a frequency basis, the accidents involving drivers 19 and 20 dropped more than five times that of drivers 21 and older. This indicates that the change in law positively influenced the involvement of young drivers in 3FS accidents.

Finally, the analysis shows that the raised drinking age contributed to a savings in lives, accidents, and associated economic costs. Approximately 55 lives and 2,750 accidents were saved in the three-year period following the raising of the drinking age. This resulted in a total benefit of approximately 16.7 million dollars.